Name:

at1119paper: Complete the Square, b = odd (v510)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 27x = -176$$

Add $\left(\frac{-27}{2}\right)^2$, which equals $\frac{729}{4}$, to both sides of the equation.

$$x^2 - 27x + \frac{729}{4} = \frac{25}{4}$$

Factor the left side.

$$\left(x + \frac{-27}{2}\right)^2 = \frac{25}{4}$$

Undo the squaring.

$$x + \frac{-27}{2} = \frac{-5}{2} \quad \text{or} \quad x + \frac{-27}{2} = \frac{5}{2}$$
$$x = \frac{27-5}{2} \quad \text{or} \quad x = \frac{27+5}{2}$$
$$x = 11 \quad \text{or} \quad x = 16$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 45x = 2044$$

$$x^2 - 45x + \frac{2025}{4} = \frac{10201}{4}$$
$$\left(x + \frac{-45}{2}\right)^2 = \frac{10201}{4}$$

$$x + \frac{-45}{2} = \frac{-101}{2} \quad \text{or} \quad x + \frac{-45}{2} = \frac{101}{2}$$
$$x = \frac{45-101}{2} \quad \text{or} \quad x = \frac{45+101}{2}$$
$$x = -28 \quad \text{or} \quad x = 73$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 31x = 1566$$

$$x^2 - 31x + \frac{961}{4} = \frac{7225}{4}$$

$$\left(x + \frac{-31}{2}\right)^2 = \frac{7225}{4}$$

$$x + \frac{-31}{2} = \frac{-85}{2} \quad \text{or} \quad x + \frac{-31}{2} = \frac{85}{2}$$

$$x = \frac{31 - 85}{2} \quad \text{or} \quad x = \frac{31 + 85}{2}$$

$$x = -27 \quad \text{or} \quad x = 58$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 49x = -588$$

$$x^2 - 49x + \frac{2401}{4} = \frac{49}{4}$$

$$\left(x + \frac{-49}{2}\right)^2 = \frac{49}{4}$$

$$x + \frac{-49}{2} = \frac{-7}{2} \quad \text{or} \quad x + \frac{-49}{2} = \frac{7}{2}$$

$$x = \frac{49 - 7}{2} \quad \text{or} \quad x = \frac{49 + 7}{2}$$

$$x = 21 \quad \text{or} \quad x = 28$$